SDC DIGEST: ORBIT*

On-Line Retrieval of Bibliographic Text

Knowledge, and therefore documentation, in all fields is expanding at such a rate that the individual executive, scientist or scholar faces an enormous sorting problem when he seeks specific information on a given subject. According to one estimate, 1,143,000 works on technical subjects alone will be published in 1967. Computer systems can provide rapid, selective access to information, but too often they require the intermediary services of a skilled computer specialist—a requirement that limits their usefulness to most researchers.

To make the benefits of direct access to a large computer-based bibliographic information retrieval system available to the researcher who has no training in computer programming, SDC has developed a time-shared system called ORBIT (On-Line Retrieval of Bibliographic Text). Through ORBIT, a person at a remote teletype or dataphone terminal can communicate directly (on-line) with a central computer and receive detailed bibliographic descriptions of documents from a sizable collection that contain material of interest to him.

He has only to describe, in English, the kind of information he wants and ask the retrieval program stored in the computer to find references that fit his description.

ORBIT offers the user the ability to retrieve bibliographic information on the basis of descriptors (meaningful terms or short phrases from a document that are used to index it), authors' names or topical subjects. So that only the references that are most responsive to his needs will be called up, ORBIT makes it possible for him to further qualify his request.

The retrieval program ranks the selected references according to their responsiveness to the query so that the user can elect to have only the higher ranking references printed out if he wishes. In addition, he can choose the format in which he would like the references to appear—either a standard format that includes comprehensive information or one that includes only the specific items of information that he needs.

For the first-time user, ORBIT can explain, in English and at length, the options that are available to him and the instructions he must use to operate the system. Once familiar with the necessary procedures, the user may send commands to the system and receive responses in a faster, abbreviated form. He may return to the more lengthy instructional mode at any time if he needs further explanation.

Retrieval Options *By Descriptors*. A thesaurus of all descriptors that are used

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ORBIT IS NOW OPERATING
PLEASE IDENTIFY YOURSELF.  LAST NAME FIRST.
*BARRETT, R.
FROM WHAT STATION PLEASE?
*11
O.K.
THE DATA BASE CURRENTLY CONSISTS OF BIBLIOGRAPHIC DATA EXTRACTED
FROM 54685 DOCUMENTS.
 IF AT ANY POINT IT BECOMES DESIRABLE TO TERMINATE A REQUEST,
ENTER--ABORT--
DO YOU WISH SHORT OR LONG FORM OF QUERIES?
*LONG
ENTER PRIMARY METHOD OF RETRIEVAL. DESCRIPTORS, AUTHORS, OR
SUBJECT CODE.
*DESCRIPTORS
ENTER A MAX OF 10 RETRIEVAL TERMS. PLACE AN ASTERISK BEFORE THE
MUST TERMS.
      1.   WEIGHTLESSNESS
      2.   HYPOXIA
      3.   SPACE MEDICINE
      4.   HUMAN PHYSIOLOGY
      5.   SPACE PHYSIOLOGY
      6.   ANIMAL PHYSIOLOGY
      7.   BLOOD
      8.   BIOLOGIC METABOLISM
      9.   CARDIOVASCULAR SYSTEM
     10.   OXYGEN CONSUMPTION

   DESCRIPTOR   1=  70 POSTINGS.
   DESCRIPTOR   2=  71 POSTINGS.
   DESCRIPTOR   3=  38 POSTINGS.
   DESCRIPTOR   4=109 POSTINGS.
   DESCRIPTOR   5=  51 POSTINGS.
   DESCRIPTOR   6=196 POSTINGS.
   DESCRIPTOR   7=140 POSTINGS.
   DESCRIPTOR   8=216 POSTINGS.
   DESCRIPTOR   9=157 POSTINGS.
   DESCRIPTOR  10=  19 POSTINGS.

SPECIFY THE 'NUMBERS' OF THE TERMS YOU WANT DELETED.
SEPARATE THE NUMBERS BY A SPACE.
*8

DESCRIPTORS      8         DELETED.  CONTINUING...
   716 DOCUMENTS EXIST FOR THIS RETRIEVAL REQUEST.
    15 DOCUMENTS CONTAIN    3 OF THE DESCRIPTORS.
   105 DOCUMENTS CONTAIN    2 OF THE DESCRIPTORS.
   596 DOCUMENTS CONTAIN    1 OF THE DESCRIPTORS.
DO YOU WISH TO QUALIFY THESE DOCUMENTS BEFORE OUTPUT?
*YES
QUALIFYING MAY BE DONE BY:

QUALIFIER
     #1 = COUNTRY OF INFORMATION   (2 LETTER CODE)
     #2 = TYPE OF DOCUMENT         (2 LETTER CODE)
     #3 = SUBJECT AREA             (2 DIGIT CODE)
     #4 = DATE IN YEARS            (XX-XX)
     #5 = RESTART QUALIFYING

SEPARATE MULTIPLE QUALIFIERS OF ONE TYPE BY A SPACE.
SPECIFY QUALIFIERS DESIRED PLUS VALUES TO BE USED.
*1 UR PO (USSR, POLAND)
   449 DOCUMENTS REMAIN FOR THIS REQUEST.
    12 AT 3 HITS,  72 AT 2 HITS,  365 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*1 UR
   439 DOCUMENTS REMAIN FOR THIS REQUEST.
    11 AT 3 HITS,  72 AT 2 HITS,  356 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*4 64-66
   425 DOCUMENTS REMAIN FOR THIS REQUEST.
    11 AT 3 HITS,  71 AT 2 HITS,  343 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*4 66-66
   183 DOCUMENTS REMAIN FOR THIS REQUEST.
     5 AT 3 HITS,  40 AT 2 HITS,  138 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*3 22 (SPACE TECHNOLOGY)
    51 DOCUMENTS REMAIN FOR THIS REQUEST.
     2 AT 3 HITS,  16 AT 2 HITS,   33 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*2 ST (JOURNALS AND RELATED PUBLICATIONS)
    14 DOCUMENTS REMAIN FOR THIS REQUEST.
     2 AT 3 HITS,   4 AT 2 HITS,    8 AT 1 HIT ,
SPECIFY ADDITIONAL QUALIFIER DESIRED.
*NONE
ENTER THE NUMBER OF DOCUMENTS TO BE PRINTED ON-LINE.
*1
DO YOU WISH TO SPECIFY THE ELEMENTS YOU WANT OUTPUT?
* NO

ACCESSION NUMBER-------AN6030737 REEL/FRAME=0919/2701   NUMBER HITS---3
TITLE-----------------TASKS INVOLVED IN THE KOSMOS-110 EXPERIMENT
TYPE OF DOCUMENT-------STEP                    DATE--------190366
PUBLISHING COUNTRY-----USSR
COUNTRY OF INFORMATION-USSR


SUBJECT AREA----------BIOLOGICAL/MEDICAL SCI
                      SPACE TECHNOLOGY
SOURCE----------------KRASNAYA ZVEZDA, 19 MAR 66, P. 5, COL. 1-4
AUTHOR----------------GAVRILOV, S.
TOPIC TAGS------------CALCIUM, SPACE PHYSIOLOGY, BIOLOGIC METABOLISM,
                      BIOTELEMETRY, CARDIOVASCULAR SYSTEM, DOG, WEIGHT
                      LESSNESS, SPACE FLIGHT, AEROSPACE PERSONNEL, BIO
                      LOGIC ACCELERATION EFFECT, BLOOD PRESSURE / KOSM
                      OS-110 SPACE FLIGHT

HOW MANY MORE ON-LINE?
*0
ENTER THE NUMBER OF DOCUMENTS TO BE PRINTED OFF-LINE.
*0
ARE YOU THROUGH USER BARRETT
*YES


ORBIT IS NOW OPERATING
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Typical exchange between ORBIT and researcher. (Asterisks precede researcher's inputs.)

as index terms in the retrieval program is available as an aid to the researcher. He may use as many as ten of these descriptors in formulating a request for information. He can cover the area he is interested in by selecting as many related or nearly synonymous terms as is convenient (such as "climatology," "weather forecasting," "atmospheric pressure").

The user can increase the selectivity of the program by designating any of his descriptive terms a "must" term. If he does this, the program will consider only references that are indexed by the "must" term or set of terms. If the references also match other descriptors of secondary importance, so much the better.

By Author. The user also has access to a list of all names in the system's author file. He may pick any name and be directed to all of the works in the collection by that author. If he names more than one author (he may choose as many as ten), documents coauthored by any two or more of the people designated will be selected first.

By Subject. All of the stored document references are indexed according to a list of subject areas that is available to the user. Since any single document may include information on several subjects, references may be indexed in more than one subject area. By typing the appropriate subject area code (provided in the list), the user can gain access to all of the references that fit the category he has selected.

Using Orbit When a researcher sits down at a remote terminal to use ORBIT, he identifies himself to the system, and the current size of the data base (collection of document references) is printed out for him.

After he has specified the descriptors, authors or subject area he is interested in, the ORBIT retrieval program searches the stored references and prints out the number of documents that match the request. For a subject query, this is always one total, since only one subject area can be requested at a time.

When descriptors are used, the printout shows how many documents match each descriptor; the total is similarly broken down when multiple authors are specified. For example, if a user's request included three descriptors, he might learn that 14 documents matched descriptor 1, 32 matched descriptor 2, and 2 matched descriptor 3.

The program then gives him the option to delete descriptors. It also ranks each responsive reference by the number of "hits" it receives. (A "hit" occurs when a term used to index a document matches a term supplied by the user.) If the user chose to delete descriptor 3, he might be informed that 42 documents remained for his request: 4 with 2 hits; 38 with 1 hit.

The researcher may next proceed to narrow the field further by imposing qualifiers on the body of publications he has isolated. For instance, he might qualify his request to include only documents published between 1965 and 1967 and receive the response that 12 documents remained: 1 with 2 hits; 11 with 1 hit. He could then state that he was interested only in technical reports, reducing the group to 6, all with 1 hit.

Subject areas may also be used as qualifiers; and other qualifiers may be added, depending on the composition of the data base. For example, the Committee on Scientific and Technical Information's subject codes could be applied to technical information. If the document collection included translations, country of origin could be used as a qualifier.

If the researcher imposes a qualifier that eliminates all of the remaining references he is informed that he has "zeroed out" the documents; and the total and ranking data that immediately preceded the fatal qualifier are reinstated.

The researcher may abort the whole inquiry and start over at any time during the interchange; or he may restart the qualifying process with the original group of documents retrieved by the program. When he is satisfied that he has arrived at an appropriate number of references that are likely to meet his specific needs, he may discontinue qualifying and ask that the references be printed out.

Specifying the Output As many of the selected bibliographic references may be printed out as the researcher wishes. The ones with the highest number of hits will be printed first, and the process will continue until the requested number of remaining references has been printed out on-line; or, if there are too many to wait for at the terminal, he may have the bulk of them printed out off-line at SDC and airmailed to him. In either case, the higher ranking references will be printed first.

References may be printed out either in a standard format or a shorter format at the researcher's option. The standard format includes the document's location (library accession number, microfilm reel and frame number), title, type, source, date, subject, author, descriptors and number of hits. The format may be shortened by specifying that only certain of these items be printed.

Size and Potential ORBIT can handle as many document references as the storage capacity of the central computer system will allow. The present data base is 60,000 documents, and it has been estimated that upward of 100,000 could be included without significantly altering the system's average response time of one to two seconds.

There is no restriction on the kind of material the system can handle. Technical and scientific documents compose the current collection, but ORBIT could serve equally well for any document system.

The ORBIT system as it is presently set up refers the researcher to complete microfilmed abstracts, extracts and tables of contents of documents included in the system's data base. These are stored in a viewer near each teletype or dataphone terminal.

Many libraries now store complete documents on microfilm. For such collections, ORBIT's microfilm reel and frame reference could direct the researcher to the full text or any pertinent section of an appropriate work. Otherwise, the accession number can guide him directly to a document in a library's stacks.

In any case, ORBIT can save the researcher fumbling through thousands of index cards or scanning voluminous alphabetic bibliographies in search of reference material that might tell him what he needs to know. In a few minutes at the terminal, he can acquire specific, selected, complete bibliographic information that might take him hours to discover and evaluate by conventional means.

As libraries and document collections continue to proliferate, this convenience is rapidly becoming a necessity.

SDC   SYSTEM DEVELOPMENT CORPORATION

July 7, 1967
L-10032

Mr. T. Nelson
Box 1546
Poughkeepsie, N. Y. 12603

Dear Mr. Nelson:

Thank you for your recent request for information on BOLD, the
experimental system for on-line display of bibliographic material.
Unfortunately, the demand has exhausted our supply of this document.

We are, however, enclosing a copy of a new publication describing
ORBIT, an operational system for On-Line Retrieval of Bibliographic
Text, which we think will be of interest to you.

Should you desire additional information, we suggest you contact:

> Mr. R. P. Barrett, Assistant Manager
> Advanced Systems Division
> System Development Corporation
> 5720 Columbia Pike
> Falls Church, Virginia 22041

Cordially,

Irwin Schorr
Head of Public Information
Corporate Communications

IS:jb
Enclosure